

9 CAT-923-78-33 1 c, MORT
Analysis of the Oxide
Conversion Facility

INTERDEPARTMENTAL CORRESPONDENCE

TO: J. P. Vournazos
DEPT: Chemical Operations
LOCATION: X-705 Building

DATE: November 17, 1978
FROM DEPT: 923
CODE NO: GAT-923-78-331c
REFERENCE:

SUBJECT: MORT ANALYSIS OF THE OXIDE CONVERSION FACILITY

To evaluate the status of the Oxide Conversion Facility's operational readiness, an abbreviated Management Oversight and Risk Tree was developed. Many of the problems identified by MORT were discussed in the meeting held on Tuesday, November 14, 1978. I have included a copy of my analysis for your information.

In the future, a more complete analysis will have to be made on the redesigned facility.

H R Giorgio
H. R. Giorgio, Health Physicist
Industrial Hygiene & Health Physics

HRG:mjc

Enc.

APPROVED FOR RELEASE BY:

W. B. Phillips NOV 22 1978

Introduction

The Management Oversight and Risk Tree is a logic tree designed to assess the root causes of an accident. The tree and logic can also be used to evaluate a program or operating facility to assure that risks are known and quantified. In this way, decisions can be made to either assume or minimize such risks.

In analyzing the Oxide Conversion Facility, only a portion of MORT was utilized. The region used is called the Design and Development Plan and assesses the safety inputs provided during the conceptual and/or modification phases of a facility. Each subcategory of this region is addressed independently.

Energy Control Procedures

In the MORT analysis, the term energy refers to the capacity to do work and is therefore essential to performance. However, if uncontrolled, this same energy could produce a deleterious effect. At the Oxide Conversion Facility, the primary energy form can be classified as kinetic movement of uranium compounds through the system. If left uncontrolled, this energy could result in the release of such compounds into the working environment, resulting in their inhalation or ingestion. The Energy Control Procedures section of the MORT analysis evaluates the mechanical safeguards engineered into the system. The next paragraphs list the faults that were found.

During normal operations, the designed flow rate through the system is continually surpassed.

During and after a release of radioactive material, there frequently is no method of its removal from the air.

Barriers on the energy source (piping flanges, valve seats, etc.) periodically and intermittently fail. In some cases, the system is enclosed in a glovebox, however, these are often inadequate and misused. The misuse of the gloveboxes stems from a number of factors: the training criteria, methodology, verification, and proof of skill is inadequate; the criteria and methodology for selecting operators is inadequate; and schedule pressure, obstacles preventing easy performance of tasks, and the fact that correct performance is punishing leads to poor employee motivation which in turn encourages the misuse of gloveboxes. The final inadequate barrier of concern is the air monitoring system. Monitors fail frequently, replacement units are not provided, individuals responsible for their use are not properly trained, and the sampling procedure is not periodically reviewed.

MORT ANALYSIS OF THE OXIDE CONVERSION FACILITY

Human Factor Review

In this portion of the tree, the system design is analyzed in terms of human factors. MORT attempts to determine if consideration has been given in the design, plan, and procedures to human characteristics as they compete and interface with machine and environmental characteristics. Weakness in these interfaces are described in the next paragraphs.

Originally the users of the system interfaced well with the design. However, the selection criteria has slackened to the point that the operators are not as qualified as in the past.

Though typical stereotypes are used throughout most of the Oxide Conversion Facility (e.g. turning a valve clockwise closes it), they are not used throughout the entire system. For example, valving layouts for two drain stations are mirror images rather than identical.

Displays are difficult to read and interpret in a short time. No consideration is given to response delays caused by interpretation time.

Because of their location, some controls cannot be operated in a short time with any degree of reliability. Due to the infrequent use of these valves, training will not alleviate the problem.

Design changes have not been made to reduce the probability of an incorrect act.

The consequences of performing steps out of sequence, for all tasks, have not been addressed. As a result, no corrective measures have been initiated.

No attempt to reduce the likelihood of operators omitting steps has been made.

It is not always necessary to perform all steps in a sequence when performing a task.

Maintenance Plan and Inspection Plan

In systems analysis, an important factor is to plan, during the conceptual stages, for the necessary maintenance and inspection. Such planning was and is nonexistent.

Arrangement

The design of a facility should take into consideration, problems associated with space, proximity, crowding, convenience, order, freedom from interruption, work flow, storage, etc. The design and modifications of the Oxide Conversion Facility did not take these into consideration,

MORT ANALYSIS OF THE OXIDE CONVERSION FACILITY

Operational Specifications

In a systems analysis, operational specifications are considered to be part of the system's design and/or development. Managerial mechanisms to evaluate performance, to pre-test specifications, and to make modifications when necessary are essential for a complete design plan. MORT examines the mechanisms by which an operation is maintained in a productive mode. The following shortcomings were noted for the Oxide Conversion Facility.

There are no guidelines for the amount and quality of supervision required during normal or abnormal situations.

Not all procedural changes or system modifications are accompanied by a dry-run or demonstration to prove out all hardware and to check for any oversights.

Personnel are not provided with all the training necessary to adequately perform a task when it has been modified. Pre-job briefings and hands-on experience is lacking.

Personnel selection criteria results in unqualified individuals being assigned to the facility.

Summary

As presently staffed and operated, the Oxide Conversion Facility is not properly designed. Most major factors contributing to a good design and development plan are less than adequate. Whether or not the facility was originally designed and staffed properly is unknown. It is possible that weak points in other areas of the MORT analysis contributed to the deterioration of the system, allowing it to be operated in a less than adequate manner.